REMARKS

The Examiner is thanked for the due consideration given the application. Claims 12-20 and 22-26 are pending in the application. No new matter is believed to be added to the application by this response.

Entry of this response under 37 CFR §1.116 is respectfully requested because it places the application in condition for allowance or alternately, it reduces issues for appeal.

Rejections Under 35 USC §103(a)

Claims 12-14, 16-20 and 22-26 have been rejected under 35 USC §103(a) as being unpatentable over TAMURA et al. (*14th Annual Meeting of the IEEE*, Vol. 1, 12-13 Nov. 2001, pp.97-98) in view of LEDENTSOV et al. (U.S. Publication 2003/0206741). Claim 15 has been rejected under 35 USC §103(a) as being unpatentable over TAMURA et al. in view of LEDENTSOV et al., and further in view of KAMIOKA et al. (JP 2001-024289). These rejections are respectfully traversed.

The present invention pertains to a modulator-integrated light source that operates over a wide temperature range. The modulator-integrated light source of the present invention is illustrated, by way of example, in Figure 2A of the application, which is reproduced below.
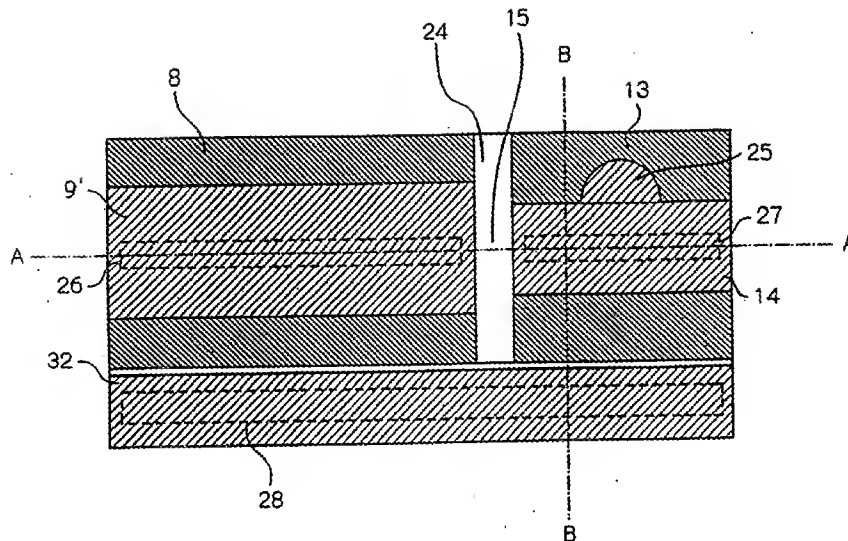
Figure 2A shows a p electrode 14, an n electrode 32 and contact windows 26 and 28. An electrode separator 15 and SiO_2 film 24 divide the p electrode 14.
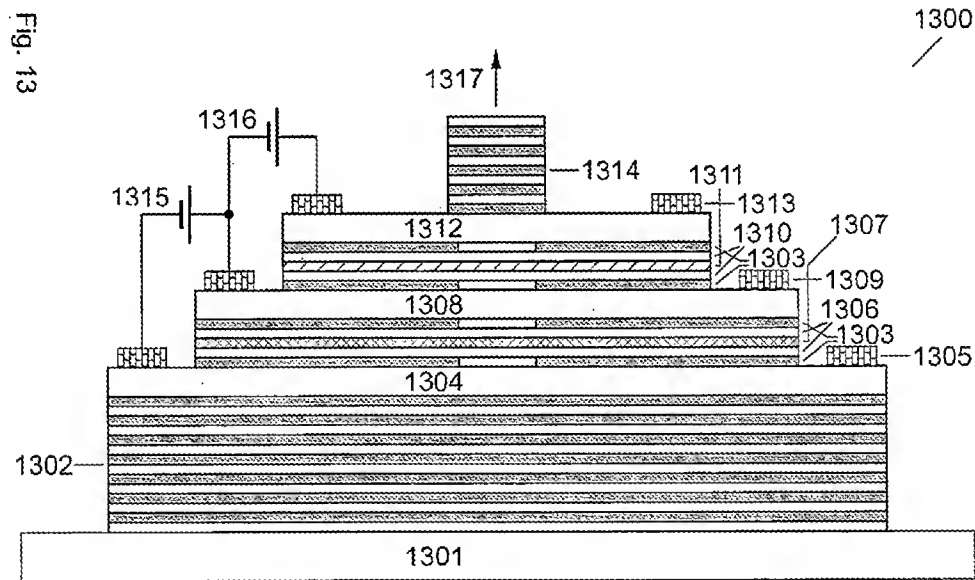
The electroabsorption of the optical modulator of the present invention satisfies the condition "L × B ≥ 2000 μm • Gb/s where L is a length of said electroabsorption optical modulator and B is an operating frequency," as is set forth in claim 12 of the present invention. Claim 12 of the present invention also optimizes (that is, eliminates) temperature effects by setting the energy conversion value ΔX of a detuning amount to be "40 meV ≤ ΔX ≤ 100 meV." These mathematical relationships represent ratios that cannot be derived from the applied art references.

TAMURA et al. pertain to ultrafast electroabsorption modulators. The Official Action asserts that TAMURA et al. do not disclose that the energy conversion value ΔX of the detuning amount of an electroabsorption optical modulator satisfies a

condition 40 meV $\leq \Delta X \leq$ 100 meV, but since LEDENTSOV et al.
disclose that the energy conversion value ΔX of the detuning
amount is 100 meV, it is easy for anyone of ordinary skill in the
art to obtain such a condition by combining the teachings of
TAMURA et al. with the teachings of LEDENTSOV et al.

However, the construction and the operation of the
present invention are different from those of the modulator of
LEDENTSOV et al.

In the modulator of LEDENTSOV et al., the energy
conversion value ΔX of the detuning amount of modulator layer
1311 is set to 100 meV (see Figure 13, reproduced below).

In Figure 13 of LEDENTSOV et al., modulator layer 1311
is formed in the interior of the resonator of a VCSEL to obtain a
variable oscillation wavelength function in the VCSEL.

Specifically, the resonator comprises top mirror 1314 and bottom
mirror 1302, and modulator layer 1311 is formed in the section
between top mirror 1314 and bottom mirror 1302.

In contrast, according to the present invention, the
energy conversion value ΔX of the detuning amount of the
modulator layer which is external to the distributed feedback
laser satisfies the condition 40 meV $\leq \Delta X \leq$ 100 meV.

As described above, in the construction of the present
invention, the modulator layer in which the energy conversion
value ΔX should be set is formed on the outside of the resonator.
In this respect, the present invention differs from the modulator
of LEDENTSOV et al.

There is at least the following difference in operation
due to the above differences between the present invention and
LEDENTSOV et al.

In the construction of LEDENTSOV et al., the refractive
index of modulator layer 1311 is tuned to control a phase of the
VCSEL, thereby modulating the oscillation wavelength of the VCSEL
(please refer to "refractive index of the modulator is tuned" in
paragraph 0059 and "additional phase control" in paragraph 0049).
In this process, it is assumed that the purpose is to minimize
the change of loss produced in the modulator layer so that the
amount of light that the laser outputs is constant. The purpose
is obvious from the description: "It is important to achieve
significant wavelength shift, and simultaneously not to have

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strong absorption at the cavity wavelength," in paragraph 0138.

On the other hand, in the present invention, the modulator layer is formed on the outside of the resonator. This construction corresponds to an intensity modulator in which electroabsorption is employed to control optical absorption. In this construction, since the modulator layer is formed on the outside of the resonator, the oscillation wavelength of the laser cannot be controlled, but the intensity of the laser can be modulated. Thus, the modulator layer in the present invention corresponds to the intensity modulator and the operation thereof differs from the modulator of LEDENTSOV et al.

As described above, the construction and the operation of the modulator layer of the present invention are different from those of the modulator of LEDENTSOV et al. Therefore, LEDENTSOV et al. do not disclose the feature of the present invention in which the energy conversion value ΔX of the detuning amount satisfies the condition 40 meV $\leq \Delta X \leq$ 100 meV.

In addition, TAMURA et al. do not disclose the features of the present invention. Therefore, one of ordinary skill in the art would fail to produce a claimed embodiment of the present invention by combining the teachings of LEDENTSOV et al. with the teachings of TAMURA et al. KAMIOKA et al. fail to address the above described deficiencies of LEDENTSOV et al. and TAMURA et al. A *prima facie* case of unpatentability has thus not been made.

Moreover, according to the present invention, since the energy conversion value ΔX of the detuning amount of the modulator layer satisfies the condition 40 meV ≤ ΔX ≤ 100 meV, superior extinction can be obtained in both a high-temperature environment and a low-temperature environment (see paragraph 0024). In the combined teachings of LEDENTSOV et al. and TAMURA et al., such an effect cannot be obtained. The present invention thus shows unexpected results over LEDENTSOV et al. and TAMURA et al. (and KAMIOKA et al.).

These rejections are believed to be overcome, and withdrawal thereof is respectfully requested.

Conclusion

The Examiner is thanked for considering the Information Disclosure Statement filed August 18, 2006 and for making an initialed PTO-1449 Form of record in the application.

Prior art of record but not utilized is believed to be non-pertinent to the instant claims.

It is believed that the objections and rejections have been overcome, obviated or rendered moot and that no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional

fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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